

**AMENDMENTS TO THE SPECIFICATION:**

On page 1, line 4, prior to TECHNICAL FIELD OF THE INVENTION, please insert the following:

This application claims priority as a continuation of U.S. Patent Application  
Serial No. 10/060,739 filed January 30, 2002.

Please replace the paragraph bridging page 4, line 20 through page 5, line 7 of the specification with the following:

According to a still further embodiment of the present invention, the comparator comprises: 1) an operational amplifier having an inverting input coupled to the storage capacitor; 2) a first resistor (R1) having a first terminal coupled to ~~ground~~ an output of the operational amplifier and a second terminal coupled to a non-inverting input of the operational amplifier; and 3) a second resistor (R2) having a first terminal coupled to ~~an output of the operational amplifier~~ ground and a second terminal coupled to the non-inverting input of the operational amplifier, wherein the operational amplifier output comprises the comparator output.

Please replace the paragraphs bridging page 13, line 13 through page 15, line 5 of the specification with the following:

After the circuit reaches a steady state, assume that output voltage  $V(O)$  of the operational amplifier has just saturated at  $V(O) = V(SAT)$ . Transistor 230 is in its active region if

$$V(SAT) - V(IN) \geq V(t),$$

where  $V(t)$  is the cut-in voltage of transistor 230. Transistor 220 is cut-off because its emitter terminal is at a higher voltage than its base terminal. As a result,

$$I(2) = [V(SAT) - V(t) - V(IN)]/R_3$$

and  $I(1) = 0$ . Therefore, the current through capacitor  $C1$  is:

$$I(C) = I(1) + I(2) = I(2).$$

The voltage  $V(C)$  across capacitor  $C1$  rises linearly and is given by

$$\begin{aligned} V(C) &= [I(2)/C_1]t - \beta V(SAT) \\ &= [[V(SAT) - V(t) - V(IN)]/R_3C]t - \beta V(SAT), \end{aligned}$$

where  $t$  denotes time.

When  $V(C) = V_- = \beta V(SAT)$  after time  $T1$ , the output  $V(O)$  changes to  $-V(SAT)$ . Time  $T1$  is computed as follows:

$$\begin{aligned} V(C)(T1) &= \beta V(SAT) \\ [[V(SAT) - V(t) - V(IN)]/R_3C]T1 - \beta V(SAT) &= \beta V(SAT) \end{aligned}$$

$$T1 = [2\beta V(SAT)R3C]/[V(SAT)-V(t)-V(<<1>>IN)]. \quad (1)$$

After time T1, transistor 230 is cut-off because its base-emitter junction is reverse biased. However, transistor 220 is in its active region if

$$-V(SAT) + V(IN) \geq V(t).$$

As a result, I(2) = 0 and the current through the capacitor C1 is given by

$$I(C) = I(1) = [-V(SAT)+V(IN)+V(t)]/R3.$$

The voltage across capacitor C1 falls linearly and is given by:

$$\begin{aligned} V(C) &= [I(C)/C1](t - T1) + \beta V(SAT); \\ &= [[-V(SAT)+V(IN)+V(t)]/R3C1](t - T1) + \beta V(SAT). \end{aligned}$$

At time t-T1 = T2, the capacitor C1 voltage V(C) = -βV(SAT), and the output switches to +V(SAT), thereby starting a new cycle of oscillation. T2 is found as follows

$$\begin{aligned} V(C)(T1 + T2) &= -\beta V(SAT) \\ [[-V(SAT)+V(IN)+V(t)]/R3C1]T2 + \beta V(SAT) &= -\beta V(SAT) \\ T2 &= [2\beta V(SAT)R3C1]/[V(SAT)-V(t)-V(IN)] \end{aligned} \quad (2)$$

The frequency of oscillation, f, is defined as

$$f = 1/[T1 + T2] \quad (3)$$

Substituting Equations 1 and 2 in Equation 3, we obtain

$$f = [V(SAT)-V(t)-V(<<1>>IN)]/[4\beta V(SAT)R3C1] \quad (4)$$